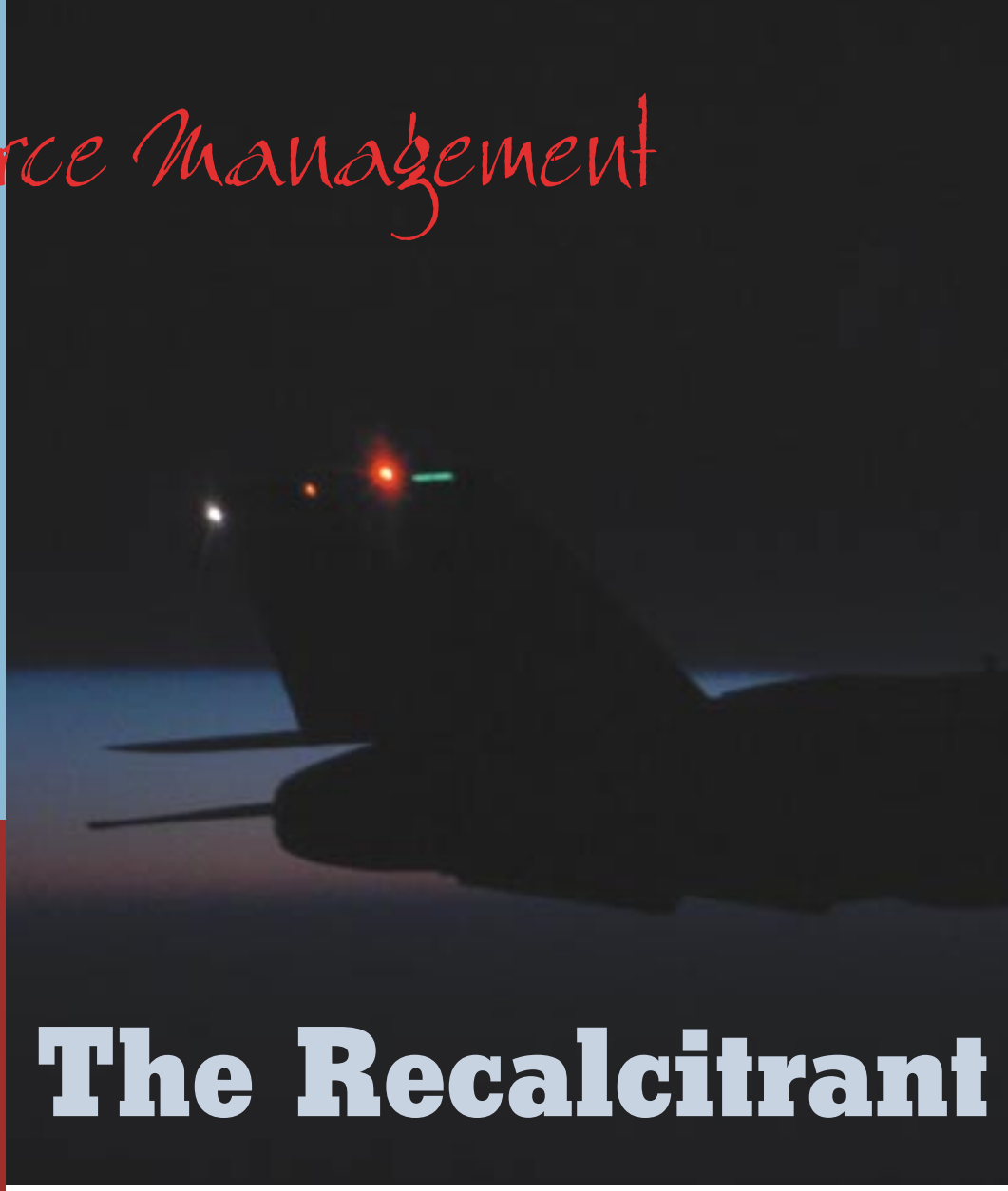
Crew Resource Management

Situational Awareness
Assertiveness
Decision Making
Communication
Leadership
Adaptability/Flexibility
Mission Analysis



The Recalcitrant

By Lt. Ashley Spalding and Lt. Hillary O'Connor

In mid-November 2003, six months after returning from deployment during Operation Iraqi Freedom (OIF), our squadron had a lot of hours to fly and training to do. We needed to maintain our readiness status. Our jets had been ridden hard during the war, and, with no time to rest after returning home, we continued to press on.

Nothing was out of the ordinary about our Tomcat flight. It was a strike-fighter weapons and tactics (SFWT) level III signoff for myself, a 2-versus-unknown night-offensive counter-air (OCA). I briefed the event, read the aircraft-discrepancy book (ADB), and walked.

Aircraft 111 had experienced multiple left-engine problems during the previous two weeks. These problems included several instances of the engine switching to SEC (degrading from electronic to mechanical control) mode multiple times during flight, and of SEC-mode

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Aircraft

degrades coincident with air-inlet-control-system (AICS) failure. Three days before our flight, the left-engine rpm rolled back to 60 percent after landing. The morning of our flight, the port augmenter-fan-temperature control (AFTC), an electronic device responsible for controlling the engine's primary mode of operation, was replaced as a fix for the SEC-mode discrepancies. The next flight, 111's second flight of the day, turned up another uncommanded SEC-mode gripe.

Start-up was uneventful, with no sign of trouble from the engines. We taxied to 05R—11,997 feet by 200 feet. We covered "Aborted Takeoff" and "Single Engine Failure Field" procedures and considerations before crossing the holdshort. We took the runway with our wingman for an eight-second, flight-lead-sep takeoff. My pilot ran up the engines and performed a control wipeout. Everything still looked good, so we started rolling.

As we left the ground, however, we immediately knew something was wrong. The aircraft was flying but with a significant sideslip. At the same time she rotated, my pilot watched the port-engine rpm slowly roll back, though there were no associated caution lights. She executed single-engine-on-takeoff procedures. The rpm was down to 60 percent when we got airborne, and the caution and advisory-indicator (CAI) panel was lit up like the proverbial Christmas tree.

I backed her on the single-engine procedure, while hawking the VSI and altimeter. The engine rpm continued to wind down as we climbed. The rpm hung up near 50 percent for a while before continuing on to bottom-out at zero a minute or two later. Our electrical power failed twice—once momentarily at the same time the CAI panel came to life, and again as the left generator fell off-line. This situation dropped the HUD off-line, which forced my pilot to use backup instruments for short periods of time until the right generator finally picked up the load for good. She nursed the jet to altitude, slow and heavy, able to milk only 180 to 190 knots out of the recalcitrant aircraft.

When we safely were away from the ground with a solid positive VSI, I called departure, declared an emergency, and told them of our intent to climb out straight ahead. We came up on our tac frequency and told our wingman not to join on us because of engine problems. Our wingman took a high cover position, offered assistance, and waited for further word from us.

When the jet was stable, we began a wide, right-hand turn toward land and set up an orbit about 20 miles northeast of Oceana to adjust gross weight. We then prepared for single-engine landing, according to the PCL. We also told departure control and our wing the extent of our emergency.

We thought about relighting the left engine but decided not to. We suspected the engine, given its documented history and sudden failure without warning. The bi-directional hydraulic-transfer pump (BiDi) was holding, so we had hydraulic power. Though dark outside, the weather was clear. We were more comfortable with a single-engine landing at our home field, in clear weather, than we were with potentially exacerbating the situation by trying to relight the left engine, now an unknown variable. We completed the "Combined Pressure Approximately 2,400 to 2,600 psi" emergency procedure and pressed on.

After reaching an appropriate landing weight, we told approach we were ready for vectors to the straight-in and

of our desire for an arrested landing on 05R. The BiDi was holding, so sufficient power still was being provided to maintain the combined-side hydraulic system. But, should the BiDi fail, we would lose several functions, notably, functional inboard spoilers and we'd only have emergency wheelbrakes available. Planning for the worst-case scenario, in which the BiDi failed and the hook failed to engage the arresting gear, we wanted the long runway in front of us. Once on the approach, we carefully walked through the "Single-Engine Landing Primary Mode," holding the emergency-flight-hydraulic switch for final.

Tower came up on our approach frequency and gave us our clearance to trap. Once we were committed to land, the emergency hyds went to high. My pilot brought down the jet, flying the 14-unit-AOA approach dictated by the "Single Engine Landing" procedure. I once again was hawking altitude and VSI, with an eye on the engine-data page on my multi-function display (MFD), looking for the earliest clue the right engine no longer was cooperating.

The mainmounts put down with a satisfying thump, followed by the nosegear, and then the gradual tug of the arresting gear as we were pulled to a stop. The flashing lights of emergency vehicles lit up the night around us. As the starboard engine was shut down, everything went quiet, our lone engine going off-line. I popped the canopy; its pneumatic hiss was a happy "welcome home" to my ears.

Examination of the engine showed a malfunctioning T4B pyrometer, which indicated to the engine it was in a constant state of overtemperature. According to NATOPS, an engine overtemperature results in the flashing of the warning chevrons and the activation of the stall-warning legend and aural tone, neither of which occurred during the initial stages of our engine failure. The overtemp-warning system checked good during the INST test of the master-test check during prestart.

Examination of this incident shows several "goods" in how it was handled. Most notable was the across-the-board display of exemplary crew coordination. Internal to our own cockpit, we were able to swiftly and accurately evaluate the situation. Actions were executed as briefed; single engine on takeoff is a standard emergency brief item for all squadron flights, and there was no doubt as to the roles and responsibilities of both crew members. The crew of our wing aircraft also provided ideal support; they were available for assistance without interfering, both in airspace and on the radio. They provided the perfect level of aid without jumping into our cockpit. Finally, the approach controller working with us that night deserves credit for his handling of the situation. He performed his duties with a minimum of comm, allowing us to provide information as the situation in the cockpit allowed. He did not press us timewise as we were adjusting gross weight, waiting for the "ready" from us, and he did not create a distraction with extraneous radio chatter.

This incident, to me, demonstrates the value of crew coordination. Though it occasionally seems rote in briefs to continually review the same procedures and coordination issues, the value of such review is immediately obvious when the situation arises.

Lt. Spalding (pilot) and Lt. O'Connor (RIO) fly with VF-213.

Mishap-Free Milestones

VMFA(AW)	27 years	100,000 hours
VP-16	40 years	260,000 hours
VAQ-132	35 years	57,000 hours
HSL-47	5 years	22,000 hours
VP-26	43 years	304,000 hours
VAW-117	28 years	59,000 hours
VAQ-134	25 years	50,000 hours
VAW-115	20 years	42,000 hours